

ARTHROPODS ASSOCIATED WITH HELLEBORINE ORCHID,
EPIPACTIS HELLEBORINE (L.) CRANTZ,
AT DUNNVILLE, ONTARIO¹

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ABSTRACT: From July 19 to August 7, 1977, helleborine, *Epipactis helleborine*, was in bloom at Dunnville. A harvestman, *Phalangium opilio*, spiders, *Araneus* sp. and *Tetragnatha versicolor*, and insects (Miridae, Syrphidae, Formicidae, Halictidae, Coccinellidae, Curculionidae) were found on the plants. The weevil, *Stethobaris ovata*, chewed the flowers and destroyed them on more than half the plants.

The helleborine, *Epipactis helleborine* (L.) Crantz, is a European orchid which was introduced into North America, first being noted at Syracuse in 1879. It was found first in Ontario near Toronto at Lambton Mills in 1890 and since then has spread over much of the southern part of the province (Soper and Garay, 1954).

In 1977 a considerable growth of this plant was found in Haldimand County in Lot 1, Concession IV South of the Dover Road, Dunn Township, recently annexed to the Town of Dunnville. The lot comprises about 90 acres and is rectangular, with its south end at the north shore of Lake Erie. There are two woodlots in it. The southerly one is at the lakeshore, surrounding summer cottages, and the northerly one is at the north end of the lot. The two woodlots are separated by a quarter of a mile of cultivated fields and pasture. Plants of helleborine were growing in both the woodlots in 1977.

The structure of the flower of helleborine and its pollination have been studied by various authors who note that the pollinating agents are almost exclusively wasps of the family Vespidae (Darwin, 1877; Judd, 1972; Knuth, 1909; Meeuse, 1961). In 1977 an investigation was done of the insects associated with this plant in the lot at Dunnville.

In the middle of July numbered stakes were placed beside twenty of the plants in the southerly woodlot and each day the number of flowers in bloom on these plants was counted. Blooming began on July 19 and continued for a three-week period until August 8, with maximum blooming occurring on July 28, 1978 (Table I). During this period the plants were examined daily and a harvestman, spiders and insects found at them were collected. Periodically, plants in the northerly woods were also examined.

Identifications were made by the following taxonomists who, unless

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otherwise noted, are with the Biosystematics Research Institute, Agriculture Canada, Ottawa: D.E. Bright (Curculionidae), D. Brown (Miridae), G. Gibson (Halictidae), M. Ivanochko (Formicidae), R. Leech, Alberta Environment, Edmonton, Alberta (Araneida), L. Masner (Vespidae), J.R. Vockeroth (Syrphidae). The harvestman was identified with keys in Edgar (1966). All specimens are deposited in the collection of the Department of Zoology, University of Western Ontario except two beetles, *Stethobaris ovata* (LeC.), kept in the National Collection, Ottawa.

ACCOUNT OF COLLECTIONS

Phalangida

Phalangidae

Phalangium opilio L. – One female harvestman was found sprawled over several flowers on a plant on August 1. It is a species commonly found in Ontario (Edgar, 1966).

Araneida

Araneidae

Araneus sp. – Two immature spiders were on a light web spun over flowers on one plant on July 22 and another was on a plant on August 5.

Tetragnathidae

Tetragnatha versicolor Walckenaer – Two spiders were found, one on a light web on flowers of one plant on July 21 and another on a web on a plant on July 24.

Tetragnatha sp. – Five immature spiders were on a web spun over flowers on one plant on August 5.

No insects or other prey were found in the webs spun by the spiders. Spiders of the genera *Araneus* and *Tetragnatha* are common web-spinning spiders in eastern North America (Comstock, 1967; Gertsch, 1949).

Insecta

Miridae

Plagiognathus obscurus Uhler – One bug was on a flower of a plant in the northerly woods on July 24. Bugs of this genus have been found at flowers of dogwood in Dunn Township (Judd, 1975).

Syrphidae

Toxomerus marginatus Say – One hover fly was on a flower on July 25. This species has been found on flowers of dogwood near the helleborine plants (Judd, 1975).

Formicidae

Lasius alienus (Foerst.) — One ant was running about over flowers on a plant on July 25. This species is widely distributed in North America (Krombein, 1958).

Halictidae

Lasioglossum (Dialictus) sp. — One bee was at a flower on July 23. Various species of this genus have been found at flowers of dogwood near the helleborine (Judd, 1975).

Coccinellidae

Hippodamia parenthesis (Say) — One lady beetle was crawling over the flowers on a plant on July 24. This species is a common one in eastern North America (Blatchley, 1910; Dillon and Dillon, 1961).

Curculionidae

Stethobaris ovata (LeC.) — Several beetles were found on the plants, both in the southerly and northerly woodlots, from July 21 to August 5. The beetles attacked the flowers by chewing circular holes in the sepals of unopened flowers and working through into the centre of the flowers. A flower so attacked turned black and withered. Of the twenty numbered plants in the southerly woodlot only ten produced flowers that bloomed through the period of blooming. One of these plants bloomed on July 21 but it was attacked by the beetles and its flowers were blackened and withered by the following day. Ten plants produced no blooms, their flowers being destroyed by the beetles. Thus, more than half of the plants were prevented from setting seed by the attacks of *S. ovata*. Several plants in the northerly woodlot were likewise found attacked by the beetles. It is thus evident that *S. ovata* is potentially a major pest of helleborine.

Stethobaris ovata has been reported from Ontario previously (Blatchley and Leng, 1916). D.E. Bright, who identified the specimens from Dunnville, reported in a letter that beetles of this species from South March, Ontario, deposited in the National Collection, were found feeding on *Habenaria hyperborea*, *Cypripedium calceolus* and *Cypripedium acaule*, all of which are orchids. It thus appears that *S. ovata* habitually feeds on plants of the Orchidaceae.

Pollination

Over the three-week period during which the helleborine was in bloom very few insects were found at the flowers, and these were species not regularly recorded as pollinators of this plant. The commonest insect found on the flowers, *Stethobaris ovata*, destroyed the flowers, and only the one bee, *Lasioglossum* sp., was actually in a flower, the other insects being found crawling over the outside of the flowers. However, after the plants had bloomed, several flowers were found with well-developed ovaries and abundant seed.

It has frequently been observed that helleborine is pollinated almost exclusively by wasps of the family Vespidae which carry pollinia on their heads from one flower to another (Darwin, 1877; Judd, 1972; Knuth, 1909; Meeuse, 1961). At Owen Sound in Ontario Judd (1972) found three species

of *Vespula (arenaria, consobrina, vidua)* pollinating the plants. The commonest of these was *V. arenaria* (Fabr.). Within 700 feet of the helleborine plants in the southerly woodlot at Dunnville there were two active colonies of *V. arenaria* which had built their nests under the eaves of cottages. At no time were these wasps seen at the flowers, but it is likely that they were the pollinators, visiting the flowers at times when the plants were not being observed.

TABLE 1. Numbers of flowers of helleborine
in bloom on twenty plants

July														
Date	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Number	0	4	13	23	34	37	48	55	59	59	65	57	50	39
August														
Date	1	2	3	4	5	6	7	8						
Number	30	22	16	13	8	3	1	0						

LITERATURE CITED

- Blatchley, W.S. 1910. Coleoptera or beetles known to occur in Indiana. Nature Publishing Co., Indianapolis.
- Blatchley, W.S. and C.W. Leng 1916. Rhynchophora or weevils of north eastern America. Nature Publishing Co., Indianapolis.
- Comstock, J.H. 1967. The Spider Book (revised by W.J. Gertsch). Comstock Publishing Associates, Ithaca, New York.
- Darwin, C. 1877. The various contrivances by which orchids are fertilized by insects, 2nd. edition. D. Appleton and Co., New York.
- Dillon, E.S. and L.S. Dillon. 1961. A manual of common beetles of eastern North America. Row, Peterson and Co., Evanston, Illinois.
- Edgar, A.L. 1966. Phalangida of the Great Lakes Region. American Midland Naturalist, 75 (2): 347-366.
- Gertsch, W.J. 1949. American Spiders. D. VanNostrand Co., New York.
- Judd, W.W. 1972. Wasps (Vespidae) pollinating helleborine, *Epipactis helleborine* (L.) Crantz, at Owen Sound, Ontario. Proceedings, Entomological Society of Ontario (1971), 102: 115-118.
- Judd, W.W. 1975. Insects associated with flowering silky dogwood (*Cornus obliqua* Raf.) at Dunnville, Haldimand County, Ontario. Ontario Field Biologist, 29 (2): 26-35.
- Knuth, P. 1909. Handbook of flower pollination. Vol. 3. Clarendon Press, Oxford.
- Krombein, K.V. 1958. Hymenoptera of America north of Mexico - Synoptic catalog. United States Department of Agriculture, Agricultural Monograph No. 2, First Supplement.
- Meeuse, B.J.D. 1961. The story of pollination. Ronald Press Co., New York.
- Soper, J.H. and L.A. Garay. 1954. The helleborine and its recent spread in Ontario. Federation of Ontario Naturalists, Bulletin 65: 4-7.